

Reprinted from the JOURNAL OF NERVOUS AND MENTAL DISEASE, February, 1892.

A CASE OF TUMOR OF THE CEREBELLUM, IN WHICH TREPHINING WAS DONE FOR THE RELIEF OF INCREASED INTRA-CRANIAL PRESSURE.¹

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INASMUCH as the indications for surgical interference with intra-cranial growths are not yet absolutely determined, it has seemed worth while to report the following case, as one of the first where operation was undertaken primarily to relieve symptoms, rather than to effect a cure.

The temporary relief afforded by opening the skull and thus diminishing the intra-cranial pressure has been made evident by the results following certain operations, where either the new growth was not found or it was too large or too deeply seated to be removed. At the first Congress of American Physicians and Surgeons, in 1888, Weir suggested the propriety of trephining to relieve symptoms in cases where the new growth was inaccessible or where its seat could not be determined. At the Tenth International Congress in Berlin, in 1890, Horsley urged the advantages of such a procedure, and mentioned six cases where he had trephined, simply to relieve pressure, with beneficial results. In some of the other cases of operative interference, relief of pressure seems to have been one indication for the operation, but it was not the primary object. Horsley's six cases and the case about to be reported are, as far as I can learn, the only cases where relief of pressure was the primary object. In a recent contribution on the subject I unfortunately overlooked Weir's suggestion made in 1888, but the credit of the suggestion belongs to him and not to Horsley.

¹Read before the American Neurological Association September 22, 23, 24, 1891.



On the 30th of October, 1890, I was asked to see R. W., a lawyer, unmarried, aged 28; born in this country of German-Jewish parents. The family history was negative. His own previous history was good, except that at the age of seventeen months he had acute anterior poliomyelitis, and the left leg was left paralyzed and atrophied. Venereal disease and the excessive use of alcohol were denied, but he had smoked freely.

For several years he had had constipation and some indigestion; this was attended with occasional dull headache, but he considered himself well until the spring of 1889. About this time he began to have severe headache in the right occipital region. He grew irritable, left his home and lived by himself for some time, refusing to have anything to do with his family, and seldom seeing his friends. The headache increased during the summer, until early in October it was so severe that he went to bed and stayed there a week, when it ceased. On getting up he began to notice an occasional black cloud before the eyes, dimness of vision and diplopia; at times he saw three or even six objects. On the 24th of October, 1889, he consulted Dr. O. F. Wadsworth, who found no external abnormality about the eyes. The pupils were rather large, but they reacted normally. The field of vision was unimpaired and the movements of the eyes were well performed. The tension was moderate, v. o. d. c. + 0.5. = $\frac{1}{2}$, v. o. s. c. + 1.0. cyl. = $\frac{1}{2}$. Accommodation diminished; o.d. read 5 Snellen at 15 inches; o.s. c. + 1.0. cyl. read 5 Snellen at 12 inches. There was pronounced pupillitis in both eyes, extending farther and being more prominent in the right. There were many fine vessels but no hæmorrhages. The fundus elsewhere was normal.

About this time he had one or two attacks in which he cried out. He was never seen at the onset of any of them, but he frothed somewhat at the mouth and fell on the floor. The face was red and looked drawn. He stated himself that in these attacks there was merely a faint feeling about the heart when he had indigestion, at which time his heart felt uncomfortable. The headaches continued and became more severe, being situated for the most part in the occiput, but at times affecting the frontal or temporal regions. He complained of a feeling of pressure, as if a bar were being crowded through his temples. About the same time he had spells of nausea and vomiting, immediately after which the pain in the head became excruciating. This pain in the head has periods of exacerbation, in which it becomes so intense as to render

him slightly delirious. With the beginning of the trouble he lost the sense of smell. The eyesight failed slowly, until in August, 1890, the last perception of light was lost. Vision was retained longer in the left eye than in the right. One day after a severe attack of nausea, the vision returned temporarily.

He consulted Dr. G. F. Jelly, who gave him iodide of potassium in forty-grain doses, which he took for nearly a year, but somewhat irregularly. This had produced well-marked iodism when I saw him. Phenacetine, in twenty-grain doses, had, during this time, kept the headache endurable, but within a few weeks he had required small doses of morphine.

For three weeks before I saw him he had noticed a distinct failure of hearing in the left ear. For some time he had complained of peculiar sensations in the mouth. It felt distorted, the upper lip felt swollen and as if something were clinging to the roof of the mouth, the tongue, the gums, and the soft palate. The cheeks felt numb. Swallowing was fairly well performed, but he made complaint of difficulty in swallowing. He found food hard to chew, and thought the teeth made no impression on it. He could swallow hot substances better than cold, being able to drink hotter liquids than ordinary people. He complained much of thickness of speech, due, as he said, to the distortion of his mouth and to the peculiar feeling in the roof of the mouth. The hands also for six weeks had felt as if they were asleep, and the nose felt numb. For a week he complained of profuse salivation, and found it hard to swallow the saliva.

There had also been pain in the eyes, and he had had occasional flashes before them. Of late he slept poorly. He was at times rather querulous, but no failure of mental power could be detected. He was quick and ready in conversation, was fond of listening to reading, and kept thoroughly informed on all the questions of the day. The speech was somewhat thick and the articulation was not very distinct, but there was no more disturbance than is often noted with healthy people, no stumbling over syllables, no incorrect use of words, nor any difficulty in comprehending what was said.

Except for the faint feelings at the beginning of the trouble there had been no disturbance of the thoracic organs. His appetite had been good until a short time before I saw him, and, except for constipation and the attacks of nausea, he had had no indigestion. He had

gained in weight during the summer. At times he had an urgent desire to urinate, but when he attempted it he could not perform the act for some time. He passed water frequently and in large amounts. With the failure of vision and his lameness, he had had some uncertainty in walking, but nothing like a staggering gait. There had been but little vertigo. For a week or more his family had noticed a little swelling of the face, most marked on the left side, but there was no distortion; within a few days the swelling had seemed greater on the right.

The patient was well developed and well nourished. The left leg and thigh were much wasted, cold to the touch, and the foot presented the characteristic deformity of poliomyelitis—talipes equino-varus. There was a pustular iodide acne over the nose and forehead. The eyes were kept partly closed, but he could open them fairly well, the levator muscles seeming a trifle weak. The right eye was not moved outwards quite so far as the left. The right side of the upper lip and of the tongue was a little swollen, and the right naso-labial fold was a trifle less pronounced. Otherwise the movements of the eyes, face and tongue were normal, but the masseters were not very strong. The pupils were dilated, equal, and reacted to convergence though not to light. Vision and smell were lost. Hearing in the left ear was much diminished; he could understand only when I spoke in a loud tone. Sensibility to temperature was good, except that it was very slightly diminished in the left cheek; sensibility to touch was everywhere normal. Dynamometer: right, 50 kg.; left, 35 kg. He grasped the dynamometer somewhat clumsily with the left hand. Otherwise no ataxia was noted. The pulse was 100. Examination of the thoracic organs was negative. The muscles of the face and jaws reacted normally to faradism. The membrana tympani showed nothing remarkable. There was double optic neuritis. The reflexes were normal, except that there was no knee-jerk in the left leg. The gait was natural, and there was no uncertainty of station on closing the eyes. There was no tenderness on percussing the skull.

On the 6th of November he was still suffering from severe pain in the head, usually of a shooting character, and involving the right eye and right side of the face. Although the iodide had been discontinued, the numbness in the face, the peculiar sensations in the mouth, the stiffness of the jaws and the trouble in chewing, and the subjective difficulty of speech had increased. The numbness of the hands

was greater and most marked on the ulnar side. The tactile sensibility of the left side of the face was perhaps a trifle diminished. The tactile and muscular sensibility of the hands was good. The masseters were weak. The tongue protruded to the right, but he could protrude it to the left. Of late he had been restless and slept poorly, and he twisted his hands as if the numbness were uncomfortable. Salivation was increased, and he would spit frequently, but he could swallow well. There was a tender spot on the right temple, and pressure or percussion caused a deep-seated pain. He had considerable itching of the nose and face. Pulse, 104.

I advised an operation, and the family took it under consideration. For several weeks, however, he had a distinct remission of the severe pain, so that nothing was done; but the pain returned, and I was called in again on the 8th of January, 1891. The headache had then become more severe. The unpleasant paræsthesiæ about the mouth persisted. He had a sensation in the left ear as of bubbling. For a time that night his right arm felt as if it were paralyzed. The numbness of the hands persisted. He made up his mind to an operation, viewed the prospect cheerfully and courageously, and was the only one of the family to keep in good spirits. He was admitted to the Boston City Hospital the 12th of January, 1891.

On the 13th his ears were examined by Dr. J. Orne Green, who made the following report:

"Deafness first noticed in left ear six months ago. A buzzing was noticed before this. The deafness was continual, now is intermittent. Right ear, no trouble till three months ago. The pain commenced on the left side and now is sharp, shooting like the beating of the pulse. No dizziness at any time. Does not talk of any high-pitched noises. Both drum membranes a little dull and very slightly contracted. They are both free from any signs of congestion, as also is the meatus.

W. v. $\frac{1}{4}$ ": l. $\frac{c}{4}$ " = 0.

V. v. $\frac{1}{3}$ ": l. moderate only through speaking tube.

Weber, F. C. on teeth, r. > l., on forehead, not head.

Rinne, F. C. r. $\frac{ac}{bc}$ = $\frac{2}{1}$: l. = $\frac{0}{10}$.

Both ears show defective hearing; right slight; left extreme. Both show defective bone conduction, nothing abnormal visible. Left ear gradual loss of hearing, coming on only after gradual loss of smell, sight, and many other symptoms, would lead me to suppose that the disease did not directly affect the auditory apparatus, but that it was possibly involved from gradual pressure from a distance.

14. W. r. $\frac{30}{60}$ l. $\frac{c}{60}$ = 0.
 V. v. $\frac{10}{25}$ l. only through tube.
 F. C. $\frac{ac}{bc}$ v. $\frac{20}{15}$ l. $\frac{0}{10}$.
 F. C. v. > l.

In left perception of F. C. and F. A. through diagnostic tube.

14 January. No distinct loss of muscular sense in either arm, yet he seemed a trifle uncertain in his movements. The tactile sensibility was normal. The knee-jerk was absent in both legs. His gait seemed a little uncertain, perhaps more uncertainty than ought to be attributed to his blindness and lameness, yet nothing very material.

15. Since entering the hospital he has been comparatively comfortable, having a good appetite, sleeping well, and having no severe pain. He required cathartics and phenacetine.

17. The knee-jerk was present in the right leg. He complained much of numbness and prickling in the right hand, but there was objectively no disturbance of sensibility. He had rather more headache, which was relieved by a cathartic. Urine high colored; acid, 1028; no albumen or sugar. Sediment, a few crystals of calcic oxalate and uric acid.

18. He has had one or two periods of severe pain, although less severe than usual. Once he required morphine. He detected the odor of cologne used about him, and noted a shadow passing before his eyes. Examination of the chest was negative. The head was shaved, the fissure of Rolando marked by the Thane-Horsley method, and the fissure of Sylvius by the rule given by Dana; and observations were made of the surface temperature.

Just below the beginning of the fissure of

Sylvius,	R. 98 1-4°	L. 98 1-2
6 cm. above external angular process,	96 1-4	96 1-2°
Parietal eminence,	97	97
4 cm. back of the upper end of the fissure of Rolando, and 3 cm. from the median line,	95 1-2	95 3-4
8 cm. back of the upper end of the fissure of Rolando, and 3 cm. from the median line,	96 1-2	96 3-4

The tender spot in the right temporal region still persisted.

19. Ether was given and Dr. E. H. Bradford operated. The operation was done with the patient in a sitting position. A curved incision seven or eight inches long was made in

the right parietal region, two or three inches above the ear. The flap was turned down and the periosteum scraped off. A trephine button an inch in diameter was removed just posterior to the anterior end of the fissure of Sylvius. Upon removal of this button the dura was found pulsating, and it bulged distinctly through the opening. Another button was removed just posterior to this, and the bridge of bone between was broken away and the opening somewhat enlarged with rongeur forceps. The dura was then opened and the brain substance palpitated with the finger, which was carried under the edge of the opening for an inch or an inch and a half in every direction. No increase of resistance was detected. The brain substance felt somewhat fluctuating, and it was incised, and a probe was inserted for three-quarters of an inch. No new growth was detected. The wound was irrigated with warm solution of corrosive sublimate, 1-10,000; the dura was replaced, but it was not sutured; the flaps were sutured with cat-gut, and a sterilized dressing and a gauze bandage were applied.

He recovered from the ether without nausea or vomiting. The pulse was regular and of good strength, and the general condition was favorable. There was some discomfort in the head, but no great pain.

20. A comfortable day. No rise of temperature. Pulse still regular and of good strength. He is somewhat restless at times, and complains of soreness of the head, especially on moving it. Slept well and took some food.

21. Condition unchanged. He dozes a good part of the time. He has no severe pain and takes a fair amount of food. Bowels moved by enema. He lies quiet and is not inclined to talk. His friends think that his hearing has become much more acute since the operation, but Dr. Green fails to find any difference.

22. Dressing changed. Wound healing well without suppuration. New dressing applied.

23. He talks more but was a very little delirious. The dressing was found moistened with a clear fluid. He complains of slight pain in the wound.

24. He is more comfortable and he has less soreness. The appetite is good and he sleeps fairly. He has phenacetine and sulfonal as required.

25. He talked strangely this morning as if wandering, but he was perfectly rational in the afternoon. He complained of pain in the occipital region.

Dr. Green reports: "The patient thinks that he can hear better, but on testing with the watch and fork no marked changes can be discovered."

26. Wound dressed. Flaps firmly united. There is a bulging at the seat of operation the size of half an orange, over which the cerebral pulsation may be seen and felt. Considerable pain this afternoon, controlled by phenacetine. He had a sensation as of smoke in the throat, and a taste of smoke, and he asked where it came from. He complains still of thickness of the tongue.

27. Dressing removed and wound dressed with absorbent cotton and collodion. The tongue is protruded to the left and the left side of the mouth is drawn up. The grip of the hands is equal. He still has pain in the wound.

28. The same symptoms of paralysis persist. He had a comfortable night and the appetite is fair. The bowels move only by the aid of cathartics. He is perfectly rational, but since the operation he has been irritable and fault-finding. He is very much disappointed that he has not regained his sight. He was anxious to return home, and therefore was discharged.

On his return the hernia was the size of half an orange, and the extreme posterior end of the incision was still ununited. He complained a good deal of soreness of the wound, but he was free from the old pain. There was complete left hemiplegia and hemianæsthesia. He was querulous and hard to get on with. Most of the time he was somnolent, yet he perceived what was going on, although his memory of events was not good. The somnolence persisted and increased. He complained much of soreness. There had been more or less oozing of blood from the posterior end of the incision, and about the 7th of February some fragments of brain substance appeared. The incision was gradually opening, and a slightly offensive odor came from it.

On the 14th, having become very nearly comatose, he began to have a profuse watery discharge from the wound, and on the 16th he began to improve. After this he was free from pain, he was mentally clear and bright, he sat up, enjoyed seeing his friends and listening to reading, and felt very well. There was no irritability or querulousness, but he was somewhat despondent because his vision did not return, as he had hoped. The hemiplegia and anæsthesia persisted.

He remained in this condition of comfort and freedom from pain, with the hernia gradually sloughing, and the discharge of fluid persisting until March 7th, when he was suddenly seized with most intense pain. He soon became comatose; the pulse and temperature rose rapidly; he could not be roused, and he died on the 9th.

An autopsy was made twenty hours after death, only the head being opened. There was a large sloughing hernia projecting through the skull, and the skin and the brain membranes were adherent to the edges of the opening. Extending upwards from the opening was a large ecchymosis in the external periosteum of the skull. The hernia was sliced off and the brain removed. Except for the hernia and the adherent meningitis nothing was noticed about the external surface of the brain, except some congestion. The blood-vessels of the base were normal. The calvaria was of good thickness, and showed no sign of absorption. The left half of the cerebellum seemed larger than the right. The brain was hardened as a whole in chloride of zinc for further examination.

After the hardening, during which the shape of the brain was unfortunately not so well preserved as might have been desired, the striking feature was a marked curving of the longitudinal tissue, the convexity pointing to the right. Owing to this the upper end of the right fissure of Rolands was over two centimetres in front of the left. The base of the hernia was of considerable size. It extended from the transverse retro-central sulcus posteriorly to the middle of the triangular part of the third frontal convolution anteriorly, and from the middle of the first temporal convolution inferiorly to the lower end of the superior precentral sulcus superiorly; involving the lower parts of the ascending parietal and ascending frontal convolutions, the posterior end of the third frontal, and a little of the second frontal, the superior temporal, and a little of the inferior parietal lobule. The ventricle, which was considerably enlarged, communicated with the opening in the hernia. The convolutions about the upper end of the right fissure of Rolando were as large, and apparently as well developed as those on the other side.

The cerebrum and the basal ganglia were normal. The left lobe of the cerebellum was enlarged, and was found to contain a large neoplasm, measuring about three centimetres antero-posteriorly and transversely, and about a centimetre and a half in thickness. It had a dense capsule, and

the interior was of a semi-solid consistency. On microscopic examination it proved to be a tubercle. Its posterior end was within six or eight millimetres of the posterior tip of the cerebellar hemisphere, it lay close up to, but not involving, the vermis cerebelli, and was close to the upper surface of the cerebellum.

The case presented no distinctive focal symptoms. By exclusion, therefore, I decided that it was probably in one of three places—in the right temporal lobe or in one of the lateral lobes of the cerebellum. The uncertainty was too great to warrant undertaking its removal, but I felt that we were justified in trephining to relieve the increased intracranial pressure. Such being the case I advised trephining over the right temporal lobe, being influenced by the local tenderness, the increased surface temperature in that region, the early loss of smell, and the deafness. The event showed that these indications were fallacious.

The operation was in part successful. It undoubtedly shortened the patient's life, but, for a time, it gave him relief from pain. In subsequent operations I should advise in the first place making a larger opening; and, in the second, tapping the lateral ventricles. In a similar case recently reported by Duncan¹ this was done with some relief. The abundant fluid discharge was probably from the ventricles, and contributed much more to the patient's relief than did the mere removal of the buttons of bone.

¹ Philadelphia Hospital Reports. Vol. I.